IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

LINEAR TECHNOLOGY CORPORATION Plaintiff, v. MONOLITHIC POWER SYSTEMS, INC. Defendant.	)))))))))	C.A. No. 06-476 (GMS)

PLAINTIFF LINEAR TECHNOLOGY CORPORATION'S
OPENING CLAIM CONSTRUCTION BRIEF

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Plaintiff Linear Technology Corporation ("Linear") submits this Opening Claim Construction Brief in support of its proposed construction of certain terms and phrases recited in asserted claims 1, 2, 34, 41, and 55 of U.S. Patent No. 5,481,178 (the '178 Patent), and asserted claims 1, 2, 3, and 34 of U.S. Patent No. 6,580,258 (the '258 Patent) (collectively the "Patents-in-Suit"). The '178 and '258 patents are related and share the same specification and similar claim terms. Therefore, citations to the patent specifications herein are only made with reference to the '178 Patent.

STATEMENT OF FACTS

I. TECHNOLOGICAL BACKGROUND OF THE '178 AND '258 PATENTS

The Patents-in-Suit relate to a category of voltage regulator circuits called "synchronous switching" voltage regulators. The purpose of a voltage regulator circuit is to provide a regulated (controlled) output voltage to a load – such as a cell phone – from an unregulated (fluctuating) voltage source.

For instance, a voltage source (*e.g.*, a battery) may supply power at raw input voltage levels that may be unusable by a device or load because this raw input voltage fluctuates to levels that are either too high or too low. Further, changes in the power demanded by the load can cause voltage fluctuations in the voltage source as it tries to compensate for such changing power demands (*e.g.*, a notebook computer demands more power when the hard drive is activated). Absent a voltage regulator, such voltage fluctuations can result in situations similar to a momentary dimming of lights in the home when an appliance (*e.g.*, air conditioner) turns on. An important attribute of the inventions claimed in the Patents-in-Suit is higher *efficiency* when providing relatively little current to a load. As stated in the specification,

> It is therefore an object of the present invention to provide a high efficiency switching regulator. It is also an object of the present invention to provide a

> control circuit and method for maintaining high efficiency over broad current ranges, including low output current, in a switching regulator circuit.

(Joint Appx., Tab A at col. 2:19-24). Efficiency is measured by the ratio of power supplied to the load (*e.g.*, a cell phone) divided by total power supplied by the source of input voltage (*e.g.*, a battery) to the regulator. The ideal – albeit unachievable – level of efficiency would be one hundred percent. One hundred percent efficiency means that *all* of the power supplied by the source is delivered undiminished to the load, with none of the power being consumed by the regulator itself. This level of efficiency is unattainable because the regulator itself needs power to operate.

Consequently, the ultimate goal of the switching voltage regulator art has been to optimize efficiency by minimizing the amount of power consumed by the regulator itself over the full range of operating currents it can supply to the load. This is because electronic companies that purchase synchronous switching voltage regulators to incorporate into their products consider longer battery life to be an important feature. (Joint Appx., Tab A at col. 2:6-8) ("The reduction in efficiency of a switching regulator at low output current can become important in battery-operated systems where maximizing battery lifetime is desirable.").

Prior art synchronous switching voltage regulators were fairly efficient when the current being supplied to the load was relatively high, but were less efficient when the current being supplied to the load was relatively low. Low load currents are typical when, for example, a portable device such as a cell phone sits in an idle state (*i.e.*, not in active use or operation, but still powered on). When the power supplied to the load is relatively high compared to the power consumed by the regulator, the efficiency ratio is relatively high. In these prior art switching regulators, however, the power consumed by the regulator generally remained the same regardless of the level of power supplied to the load. As a consequence, the efficiency of these

prior art synchronous switching voltage regulators substantially decreased when relatively little current was supplied to the load.

As consumer demand for portable devices such as cell phones and laptops rose in the late 1980s and 1990s, so did the demand and desirability for highly efficient synchronous switching voltage regulators, particularly those that were efficient under low load current conditions. Earlier attempts to address this issue required circuitry with a user-activated manual shut-off switch available for low load current conditions. Understandably, these products did not gain great market acceptance. The inventions in the Patents-in-Suit increased efficiency, especially under low current conditions – and did so automatically rather than manually.

A. The "Sleep Mode" Claims

The asserted claims of the Patents-in-Suit are referred to as the "sleep mode claims" and provide one way of achieving high efficiency at both low and high load current levels. These claims cover circuitry and methods that detect when relatively little current is being drawn by the load and, in response, shut off certain circuitry (*e.g.*, the switching transistors) within the regulator itself to conserve power. The inventors realized that, under relatively low load current conditions, the output capacitor of the regulator can temporarily act as a charge reservoir and supply current to the load for one or more switching cycles. When the load level is low, the switching action can be stopped, and circuitry within the regulator itself that consumes power can be shut off. As a result, the power that otherwise would have been consumed by switching the switching transistors on and off is saved.

Once the charge on the output capacitor drops to a certain level, or the load begins to draw a higher level of current again, this condition is detected and the circuitry within the regulator is turned back on and resumes switching. The invention thereby achieves high levels of efficiency over a broad output current range, including low output currents. Unlike prior art

voltage regulators in which transistors 16 and 17 of the push-pull switch were alternately switched on and off at all times (*e.g.*, if one transistor was on, the other was essentially off, and *vice versa*), the Patents-in-Suit disclose and recite in the asserted claims a second mode of operation – *i.e.*, sleep mode – during which the transistors in the switch (*e.g.*, switch 15 including transistors 16 and 17) are both kept OFF concurrently for at least one clock cycle[1], thereby increasing the voltage regulator's efficiency.

II. LEVEL OF ORDINARY SKILL IN THE ART

A person of ordinary skill in the relevant art for both patents would have either a BSEE or MSEE degree in electrical engineering, with 3-7 years of experience designing analog electronic circuitry and knowledge of power supplies. *See* the concurrently submitted declaration of Linear's Expert, Robert Blauschild, at ¶ 14 (hereinafter referred to as "Blauschild ¶ _").

III. LITIGATION HISTORY OF THE PATENTS-IN-SUIT

A. The Current Action

Linear brought this action to enforce an agreement ("Settlement Agreement") ending U.S. International Trade Commission ("ITC") Investigation No. 337-TA-521 (the "'521 Investigation"), whereby MPS agreed that it would not sell any products that infringe the '178 and '258 Patents, other than those specifically licensed for a limited time under the Settlement Agreement. MPS further agreed that in any action arising under the Settlement Agreement, it would not assert a defense of invalidity or otherwise challenge the Linear Patents. The parties settled the '521 Investigation before the Final Hearing commenced and before any claim

[1] Periods during which both switching transistors are off "can extend from less than 100 microseconds to over a few seconds (respectively corresponding to a few switch cycles to over one-hundred-thousand switch cycles for a switching frequency of 100 kiloHertz)." (Joint Appx., Tab A at col. 7:29-32).

construction order issued. Having learned of MPS's renewed infringement of the '178 and '258 Patents, Linear sued on August 3, 2006, alleging breach of the Settlement Agreement and willful infringement of the Patents-in-Suit.

B. Prior Litigations Concerning The Patents-in-Suit

1. The *Impala* Litigation

Linear has previously asserted the Patents-in-Suit against other parties. On June 26, 1997, Linear filed an action against Impala Linear Corporation, Toyoda Automatic Loom Works, Ltd., Analog Devices, Inc., Maxim Integrated Products, Inc., and Unitrode Corporation in the Northern District of California alleging infringement of the '178 Patent, which is the parent to the '258 Patent.[2] *Linear Technology Corp. v. Impala Linear Corp.*, Case No. C98-1727 FMS (N.D. Cal. June 9, 1999). Judge Fern Smith issued the District Court's claim construction order on June 9, 1999 ("CCO"). (Joint Appx., Tab N). The case was later re-assigned to Judge Vaughn Walker. Judge Walker modified some of the original claim constructions in the CCO in a subsequent Summary Judgment order. (Joint Appx., Tab O). Linear appealed and Maxim cross-appealed the Summary Judgment Order of non-infringement to the Court of Appeals for the Federal Circuit.

On August 17, 2004, based in part upon its revision and broadening of the district court's claim construction, the Federal Circuit issued its opinion vacating the judgment of noninfringement, and remanding for further consideration. *Linear Technology Corp. v. Impala Linear*, 379 F.3d 1311 (Fed. Cir. 2004) (Joint Appx., Tab P). Following an additional round of summary judgment briefing, the parties to the *Impala* litigation settled and Maxim took a license to the '178 and '258 Patents.

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[2] The application for the '258 Patent had not yet been filed at the time.

2. The '564 Investigation

Linear also asserted the '258 Patent in an ITC Investigation of Advanced Analogic Technologies, Inc. ("AATI"). On March 22, 2006, the ITC instituted Investigation No. 337-TA-564 under Section 337 of the Tariff Act of 1930, as amended (19 U.S.C. § 1337) for unfair methods of competition in connection with AATI's importation into the United States of products that infringed the '258 Patent and another patent not at issue here (the "'564 Investigation"). Just recently, on May 23, 2007, Administrative Law Judge Sidney Harris issued an Initial Determination ("ID") finding no violation of Section 337. (Joint Appx., Tab Q). The ALJ's ID includes claim constructions of certain terms of the '258 Patent that are incompatible with both the law of claim construction as enunciated by the Federal Circuit and the prior claim construction from the *Impala* litigation. On June 4, 2007, Linear petitioned the Commission to review the ALJ's ID, including the claim construction concerning the '258 Patent.

3. The Parties' Use Of Prior Claim Construction Orders

Here, as in previous litigations, Linear relies on the *Impala* claim construction as modified by the Federal Circuit, because these claim constructions are properly informed by the intrinsic evidence. (Joint Appx., Tabs N, O, P). Linear's proposed claim constructions for many of the terms of the Patents-in-Suit have been vetted by five different defendants and their attorneys in the *Impala* litigation that spanned nearly eight years, involved dozens of prior art references, several rounds of summary judgment motions, and a Federal Circuit appeal. *Id.* The public is currently on notice of the scope of the claims based not only on the intrinsic record, but also by virtue of the public record of the constructions issued by the *Impala* district court and Federal Circuit relating to the terms of the Patents-in-Suit. For these reasons, it is appropriate for this Court to give reasoned deference to the earlier constructions from the *Impala* litigation

and the reasoning therefore.

MPS, on the other hand, relies on certain portions of the ALJ claim construction from the '564 Investigation (now on petition for review) to support certain of its own claim constructions. Below, Linear shows why the ALJ claim construction should not be followed.

IV. LEGAL PRINCIPLES OF CLAIM CONSTRUCTION

Under Federal Circuit precedent, "the words of a claim are generally given their ordinary and customary meaning," which is the "meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, *i.e.*, as of the effective filing date of the patent application." *Phillips v. AWH Corp,* 415 F.3d 1303, 1312-13 (Fed. Cir. 2005) (*en banc*) (citations omitted). In *Phillips*, the *en banc* court clarified that reference to the "ordinary meaning" to one of skill in the art is not an invitation to define claim terms based on dictionary definitions, expert testimony, or any other source extrinsic to a patent at the expense of intrinsic sources. "[I]mportantly, the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification." *Id.* at 1313; *accord Medrad, Inc. v. MRI Devices Corp.,* 401 F.3d 1313, 1319 (Fed. Cir. 2005) ("We cannot look at the ordinary meaning of the term . . . in a vacuum. Rather, we must look at the ordinary meaning in the context of the written description and the prosecution history.") (cited in *Phillips*). Thus, a court must "focus[] at the outset on how the patentee used the claim term in the claims, specification, and prosecution history." *Id.* at 1321.

Intrinsic evidence is thus paramount. In interpreting the claims of a patent, the court should "look to the words of the claims themselves, the remainder of the specification, the prosecution history, and extrinsic evidence concerning relevant scientific principles, the meaning

of technical terms, and the state of the art" in construing claim terms. *Id.* (citation omitted). "[T]he proper construction cannot be divorced from the context of the written description and prosecution history." *Nystrom v. Trex Co.,* 424 F.3d 1136, 1145 (Fed. Cir. 2005). The Federal Circuit however, also has repeatedly emphasized that the preferred embodiment should not be read into the claims even if it is the only embodiment. *Phillips*, 415 F.3d at 1323.

In addition, "other claims of the patent in question, both asserted and unasserted, can also be valuable sources of enlightenment as to the meaning of a claim term." *Id* at 1314. "Differences among claims can also be a useful guide in understanding the meaning of particular terms." *Id.* For example, "the presence of a dependent claim that adds a particular limitation gives rise to a presumption that the limitation in question is not present in the independent claim." *Id.* at 1315; *see In re Cruciferous Sprout Litig.*, 301 F.3d 1343, 1349 (Fed. Cir. 2002) (rejecting claim construction that was inconsistent with the language of dependent claims and would render the claim meaningless).

Claim 34 of the '178 Patent is written in "means-plus-function" ("MPF") form. In construing an MPF claim, a court must identify both the claimed function and the corresponding structure in the written description for performing that function. *Cardiac Pacemakers, Inc. v. St. Jude Med., Inc.*, 296 F.3d 1106, 1113 (Fed. Cir. 2002). To determine the claimed function, a court may not import limitations that are not recited in the claims. *Id.* Similarly, in determining the corresponding structures, it is equally improper to add limitations from the written description that are unnecessary to perform the claimed function. *Id.* As a general proposition, multiple structures can perform a single claimed function. *Id.*

The Patent Act directs that MPF claims are to be construed to cover both the disclosed corresponding structure *and* equivalents thereof. 35 U.S.C. §§ 112 ¶ 6. Thus, it is improper to

limit a particular MPF claim to the particular means set forth in the specification. The statute "was written precisely to avoid a holding that a means-plus-function limitation must be read as covering only the means disclosed in the specification." *Cross Med. Prods. v. Medtronic Sofamor Danek, Inc.*, 424 F.3d 1293, 1308 (Fed. Cir. 2005).

Of particular importance here, claim construction decisions from other courts should be given "reasoned deference." *Precor Inc. v. Fitness Quest, Inc.,* 2006 U.S. Dist. LEXIS 63244 (W.D. Wash. Aug. 23, 2006) (finding prior court's claim construction "will be considered important to this inquiry . . . ."); *Maurice Mitchell Innovations, L.P. v. Intel Corp.*, 2006 U.S. Dist. LEXIS 41453, *12-13 (E.D. Tex. 2006) (finding prior court's claim construction "is entitled to reasoned deference"); *Visto Corp. v. Sproqit Techs., Inc.,* 445 F. Supp. 2d 1104, 1108 (N.D. Cal. 2006) (giving "reasoned deference" to prior court's construction).

As the Supreme Court explained in *Markman v. Westview Inst.*, were a new claim construction to issue from every court reviewing the same patent, "a zone of uncertainty" would result from the failure to clearly tell the public and competitors "what it is that limits [the patent] rights." 517 U.S. 370, 390-91 (1996) (quotations and brackets omitted); *see also Inpro II Licensing, S.A.R.L. v. T-Mobile USA, Inc.,* 450 F.3d 1350, 1359 (Fed. Cir. 2006) (Newman, J., concurring) (finding that decisions that leave a "cloud of uncertainty . . . on a patent's claims" impose "ongoing burdens on competitors . . . as well as on the patentee.") (quoting *Cardinal Chem. Co. v. Morton Int'l*, 508 U.S. 83, 102 (1993); *Markman,* 52 F.3d 967, 987 (Fed. Cir. 1995) (The "appropriate analogy for interpreting patent claims is the statutory interpretation analogy . . .. There can be only one correct interpretation of a statute that applies to all persons.").

The *Impala* court's construction of the claim terms in the Patents-in-Suit (as modified by

the Federal Circuit), thus constitutes "important" authority "entitled to reasoned deference." *See Maurice Mitchell*, 2006 U.S. Dist. LEXIS 41453 at *12-13 (Prior construction is "entitled to reasoned deference under the broad principles of stare decisis and the goals articulated by the Supreme Court in *Markman*, even though stare decisis may not be applicable per se."); *Precor*, 2006 U.S. Dist. LEXIS 63244 ("There are sensible policy reasons for a Court to construe patent claims consistently with other courts that have undertaken the same endeavor").[3]

V. CONSTRUCTION OF PARTICULAR TERMS OF THE '178 AND '258 PATENTS

As an initial matter, the '258 Patent is a continuation in a line of applications relating back to the '178 Patent, and thus both the '178 and '258 patents share the same specification and similar claim terms. The original application was filed on March 23, 1993.

A. AGREED CONSTRUCTIONS

The parties have agreed to the construction of the following three terms.

CLAIM TERMS	AGREED UPON CONSTRUCTION
Monitoring (Claims 1, 41 of '178 Patent) (Claims 1, 34 of '258 Patent)	"Monitoring" a signal or output means to keep track of it.
current supplied to the load (Claims 1, 34, 41, 55 of '178 Patent)	The output current.
output current (Claims 1, 34, 41 of '178 Patent)	The current that flows from the output terminal to the load.

B. CONSTRUCTION OF DISPUTED TERMS

The parties currently dispute the construction of the following 18 claim terms and phrases

[3] On the other hand, this Court should give the ALJ's ID no deference. ITC patent-based determinations are not binding on subsequent district court proceedings. *Bio-Technology Gen. Corp. v. Genentech, Inc.*, 80 F.3d 1553, 1564 (Fed. Cir. 1996). The Commission itself will not give deference to the ALJ's findings when it reviews the ID because it applies the *de novo* standard. *See, e.g.*, *Certain Bar Clamps, Bar Clamp Pads and Related Packaging, Display and Other Materials*, ITC Inv. 337-TA-429 Comm. Order (Dec. 3, 2001).

of the Patents-in-Suit.

1. "Switching Voltage Regulator"

The term "switching voltage regulator" is recited in asserted claims 1, 34, 41, and 55 of the '178 Patent and in asserted claims 1 and 34 of the '258 Patent. The parties' proposed constructions are:

CLAIM TERMS	LINEAR'S PROPOSED CONSTRUCTION	MPS'S PROPOSED CONSTRUCTION
switching voltage regulator (Claims 1, 34, 41, 55 of '178 Patent) (Claims 1, 34 of '258 Patent)	A device or circuit that receives an input voltage and provides a predetermined and regulated output voltage by controlling the opening and closing of one or more switching transistors. (Predetermined means determined by design, and includes voltages that may be fixed or variable).	A device or circuit that is capable of receiving a poorly-specified and fluctuating input voltage and that provides a predetermined and essentially constant output voltage by controlling the opening and closing of a switch.

Linear's construction is consistent with the understanding of one of ordinary skill in the art at the time the application for the Patents-in-Suit was filed. Fundamentally, synchronous switching voltage regulators operate to supply current to a load by receiving an input voltage and using a switch to regulate the output voltage. The patent describes switching voltage regulators as a class distinct from "series" voltage regulators. (Joint Appx., Tab A at col. 1:15-16; examples at Figs. 2-5, 7-9 and 10).

Linear's construction is also consistent with the district court's construction from the *Impala* litigation:

> The parties agree that a 'switching voltage regulator' is a device or circuit that receives an input voltage and produces a predetermined and constant output voltage. . . . Accordingly, the switching voltage regulator is further construed as controlling the on and off of the switch.

(Joint Appx., Tab N at N7, N21).

MPS's use of the word "constant" in its proposed construction of "switching voltage

regulator", a recurring theme in many of its proposed constructions, constitutes an attempt to limit the scope of the asserted claims to some idealized regulator – divorced from real-life – that can only operate under fixed and immutable operating conditions that can never vary (*i.e.*, MPS's view of "constant"). MPS's proposed constructions in this regard are at odds with the intrinsic evidence, as well as how one of ordinary skill would understand these regulators to work in the real world. For example, the specification does not speak in terms of a switching voltage regulator that provides a "constant" output voltage to a load in the sense of a fixed and unchanging output voltage, as MPS would have it. Rather, in describing the invention, the specification speaks repeatedly of how the regulator operates to "maintain the output voltage substantially at the regulated voltage level." Joint Appx., Tab A at col. 7:6-10, *see also id.* at col. 7:14-16 ("Therefore, V_{OUT} will oscillate between upper and lower thresholds"); *id.* at col. 8:10-12 ("the output voltage V_{OUT} is able to be maintained substantially at the regulated voltage level V_{REG}"); *id.* at col. 8:43-44.

MPS also proposes construing "switching voltage regulator" as "[a] device or circuit that is capable of receiving a poorly-specified and fluctuating input voltage ...."[4] This proposal impermissibly adds a limitation by taking language from the Background of the Invention section of the patents describing certain voltage regulators. (Joint Appx., Tab A at col. 1:6-14) ("Background of the Invention"). *See Dow Chem. Co v. U.S.*, 226 F.3d 1334, 1342 (Fed. Cir. 2000) ("as a general rule [the] claims of a patent are not limited to the preferred embodiment . . . or to the examples listed within the patent specification."). Addition of this limitation to the claims would, without basis, exclude from literal coverage implementations that use power sources that are not poorly specified or do not fluctuate over even a few cycles. Those of skill in

[4] The "fluctuating" language appears in the Federal Circuit's "Background" discussion of the invention, but not in any of that Court's constructions. *Linear*, 379 F.3d at 1316.

the art reading the patent would have known that the invention does not exclude such implementations.

2. "Coupled"

The term "coupled" is recited in asserted claims 1, 34, 41, and 55 of the '178 Patent and in asserted claims 1 and 34 of the '258 Patent. The parties' proposed constructions are:

CLAIM TERMS	LINEAR'S PROPOSED CONSTRUCTION	MPS'S PROPOSED CONSTRUCTION
Coupled (Claims 1, 34, 41, 55 of '178 Patent) (Claims 1, 34 of '258 Patent)	Circuit elements are coupled when a current path exists between them.	Circuit elements are "coupled" when they are so arranged that energy can transfer electrically or magnetically from one to another.

The *Impala* court construed "coupled" as Linear has construed it:

> A direct connection need not exist between circuit elements in order for them to be 'coupled.' [citations omitted]. Thus, plaintiff would appear correct that circuit elements are 'coupled' when a current path exists between them.

(Joint Appx., Tab N at N7).

This construction also comports with the intrinsic evidence. *See, e.g.*, Joint Appx., Tab A at cols. 1:20-22; 15:40-46; and Fig. 1. Nowhere in the patents or file histories is the term "coupled" used to embrace magnetic energy transfer. *See e.g., id.* at col. 3:57-58. Rather, it is used consistently throughout the specifications to refer to electrical coupling. For example, "[t]he series regulator employs a pass element (*e.g.*, a power transistor) coupled in series with a load and controls the voltage drop across the pass element in order to regulate the voltage which appears at the load." *Id.* at col. 1:17-24. The specification also refers to a transistor as being coupled to an inductor. *Id.* at col. 15:40-46. These uses of "coupled" are consistent with Linear's proposed construction, but inconsistent with that of MPS.

MPS asks this Court to adopt a construction of "coupled" that has no support in the patent

specification or the file histories so that MPS can find support for its invalidity case with the Ziermann reference. To be able to read the term "coupled" on Ziermann, MPS needs to have the claims embrace "magnetic" coupling, despite the lack of any support for this in the intrinsic evidence. That approach is both contrary to the specification's teachings, and contrary to the law that, as between a broader and narrower construction, the narrower construction should be adopted to preserve the validity of a patent. *See Modine Mfg. Co. v. U. S. Int'l Trade Comm'n*, 75 F.3d 1545, 1557 (Fed. Cir. 1996) ("[w]hen claims are amenable to more than one construction, they should when reasonably possible be interpreted so as to preserve their validity.")

Furthermore, it would be inappropriate to adopt the MPS construction because the '178 invention relies on a current path, whereas magnetic coupling is used in certain voltage regulator applications to electrically isolate structures, not to create a current path between them. *See* Blauschild ¶ 20. For example, in phone system applications such as those shown in the Ziermann reference, phone line/company circuits are isolated from consumer circuits by a transformer so that there is no electrical coupling. This isolation prevents lightning strikes on the phone lines from burning out telephones in a house. Magnetic coupling allows Ziermann to use a circuit configuration that could, if used in the coupled switching arrangement of Fig. 1 of the '178 patent, cause the electrical circuit to be destroyed. Thus, the MPS construction should be rejected.

3. "Output Terminal"

The term "output terminal" is recited in asserted claims 1, 34, 41 and 55 of the '178 Patent. The parties' proposed constructions are:

CLAIM TERMS	LINEAR'S PROPOSED CONSTRUCTION	MPS'S PROPOSED CONSTRUCTION
output terminal (Claims 1, 34, 41, 55 of '178 Patent)	A point or node of the switching regulator to which the load is coupled.	A specific point of the switching voltage regulator that is directly connected to the load.

The *Impala* court construed the "output terminal" as Linear has construed it:

> Figures 1-4 depict the 'output terminal' 12 not as a point to which the load is directly connected, as defendants contend, but rather as a point or node of the switching regulator to which the load is coupled.

(Joint Appx., Tab N at N7).

Indeed, the Impala court refused to incorporate the "directly connected" limitation that MPS now seeks to add. The court based its refusal on the description regarding "output terminal" in the specification. *See e.g.*, Joint Appx., Tab A at character 12 in Figures 1-4 and col. 3:53-57. In that description, there is no requirement that the output terminal be "directly connected" to the load. MPS's proposed construction is inconsistent with the intrinsic evidence and introduces an unnecessary ambiguity as to what is meant by "directly connected" in the context of a patent that imposes no such requirement.

4. "Load"

The term "load" is recited in asserted claims 1, 34, 41 and 55 of the '178 Patent and in asserted claims 1 and 34 of the '258 Patent. The parties' proposed constructions are:

CLAIM TERMS	LINEAR'S PROPOSED CONSTRUCTION	MPS'S PROPOSED CONSTRUCTION
load (Claims 1, 34, 41, 55 of '178 Patent) (Claims 1, 34 of '258 Patent)	A device, circuit, or system coupled to the output terminal to which the regulator can supply current.	A device, circuit, or system that consumes electric power; not part of the regulator structure.

Again, Linear's construction is consistent with that of the *Impala* court, which found that: "a 'load' must be construed as a device, circuit, or system that is merely coupled to the output terminal to which the regulator supplies current." (Joint Appx., Tab N at N7). *See e.g.*, Joint Appx., Tab A at character 12 in the Figures and col. 3:53-57.

MPS's position that the claimed "load" is not a load unless it is consuming electrical power is directly contradicted by the patent disclosure which clearly contemplates pulling power *from* the load. Joint Appx., Tab A at col. 5:21-23 ("At low output currents this can cause the current in inductor L1 to reverse polarity and, thus, pull power from the load.") and col. 5:29-32 ("This closes in the circuit will be especially the case if the current in inductor L1 reverses and power is pulled from the load to ground through N-MOSFET 17.") As the Federal Circuit also recognized:

> Also disclosed is a current reversal prevention mode where the regulator prevents the reverse flow of electrical current to forestall power from being drained from the load.

379 F.3d at 1316; *see also* Joint Appx., Tab A at col. 14:1-10.

Moreover, the term "electric power" appears nowhere in the patent specification, and there is no basis thereon to require a load to "consume" electric power at all times. In fact, MPS ignores one of the main problems in the art taught and disclosed in the patents; namely, that current from the load can reverse and be supplied by the load back through the inductor to ground. *See id.* The patent teaches how this reverse current results in the waste of power within the regulator. It is one of the objectives of the patent claims to avoid this waste and thereby improve efficiency. Although this discussion is more pertinent to the claim directed to reverse current protection (not asserted here), the term "load" appears in those claims as well.

MPS's proposed construction must be rejected because under that construction, none of the claims would read on any of the embodiments in the specification. That is because the patent

teaches that the reverse current protection feature can be used alone or in combination with the sleep mode claims. Thus, the MPS construction cannot be the correct construction. *See Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, at 1581 (Fed. Cir. 1996) (Claim interpretation that excludes the preferred embodiments "is rarely, if ever, correct.").

5. "A Pair Of Synchronously Switched Switching Transistors"

The phrase "a pair of synchronously switched switching transistors" is recited in asserted claims 1, 34, 41 and 55 of the '178 Patent and in asserted claims 1 and 34 of the '258 Patent. The parties' proposed constructions are:

CLAIM TERMS	LINEAR'S PROPOSED CONSTRUCTION	MPS'S PROPOSED CONSTRUCTION
a pair of synchronously switched switching transistors (Claims 1, 34, 41, 55 of '178 Patent) (Claims 1, 34 of '258 Patent)	Two switching transistors are synchronously switched when they are driven out of phase (i.e., one is ON and the other is OFF, except for deadtime) to supply current at a regulated voltage to a load.	A pair of switching transistors are "synchronously switched" when they are "driven out of phase to supply current at a regulated voltage to a load". "driven out of phase" means that the two switching transistors do not turn "on" and "off" at the same time at all times.

The Patents-in-Suit claim improvements in circuits and methods for controlling "synchronously switched" switching transistors. Every asserted independent claim has a preamble that states: "A circuit [or method for claim 34 of the '258 Patent] for controlling a switching voltage regulator, the regulator having (1) a switch circuit coupled to receive an input voltage and including a pair of synchronously switched switching transistors …" In addition, the body of each asserted independent claim refers to this pair of transistors and elements thereof.

The '178 Patent describes a "synchronously-switched switch" as "a switch including two switching transistors that are driven out of phase to supply current at a regulated voltage to a load." (Joint Appx., Tab A at col. 7:40-43). When two transistors are driven out of phase in this

type of application, one transistor is ON while the other is OFF in an alternating fashion. (Joint Appx., Tab A at col. 4:39-41 and col. 6:31-32). Moreover, other than the "deadtime" necessary to avoid the undesirable "shoot through" effect described below, the two transistors would be continuously and alternately ON such that one is "substantially on at all times." (Joint Appx., Tab A at col. 5:59 - col. 6:2) (comparing and contrasting the sleep and active states of circuit operation). Linear's construction is thus consistent with the specification and accords with the prior construction of the term in the *Impala* litigation. In that case, the district court concluded that "[t]hese switches turn on and off synchronously – when one is on the other is off." (Joint Appx., Tab O at O3). Indeed, the very significance of this limitation is that the switch includes operation of a pair of transistors such that when one is ON the other is OFF. Linear's construction makes this clear.

One of ordinary skill would have understood that "synchronous" in the context of switching voltage regulators means that when the switch is operating in a first state, as the specification describes, the switching transistors cannot both be on at the same time. Otherwise, they create a path from the input voltage to ground such that a destructive level of current can "shoot through" and hence damage the part. Persons of ordinary skill would have known to design in a slight "deadtime" between the time when one switch turns off and the other turns on to avoid this deleterious situation where both transistors are conducting current and "shoot through" can occur. (Joint Appx., Tab A at col. 5:33-43). MPS's construction should be rejected because it does not account for "deadtime" which is expressly described in the specification.

6. "Regulated Voltage"

The term "regulated voltage" is recited in asserted claims 1, 34, 41 and 55 of the '178

Patent and in asserted claims 1 and 34 of the '258 Patent. The parties' proposed constructions are:

CLAIM TERMS	LINEAR'S PROPOSED CONSTRUCTION	MPS'S PROPOSED CONSTRUCTION
regulated voltage (Claims 1, 34, 41, 55 of '178 Patent) (Claims 1, 34 of '258 Patent)	A voltage having a controlled value.	A predetermined and essentially constant output voltage.

Linear's proposed construction is consistent with that of the *Impala* court which construed "regulated voltage" as "a voltage having a controlled value." (Joint Appx., Tab N at N8). The Federal Circuit left that construction undisturbed.

MPS once again proposes adding limitations from the Background of the Invention. (Joint Appx., Tab A at col 1:12-14). "Predetermined" and "constant" however, are unnecessary limitations as they only describe certain voltage regulators. The specification uses the phrase "regulated voltage" to mean a controlled value, not a predetermined and essentially constant value. (Joint Appx., Tab A at col. 3:53-58; col. 4:1-2; col. 6:39-41; col. 53-58; and col. 7:6-32). In fact, no embodiment of the Patents-in-Suit shows a switching voltage regulator that provides a constant output voltage. *See* Blauschild ¶¶ 25-26. MPS's proposed construction should therefore be rejected.

7. "Substantially At The Regulated Voltage"

The phrase "substantially at the regulated voltage" is recited in asserted claim 41 of the '178 Patent and in asserted claims 1 and 34 of the '258 Patent. The parties' proposed constructions are:

CLAIM TERMS	LINEAR'S PROPOSED CONSTRUCTION	MPS'S PROPOSED CONSTRUCTION
substantially at the regulated voltage	A voltage having a controlled value, and allowing for, but not requiring,	A voltage that has a different average value than the regulated

CLAIM TERMS	LINEAR'S PROPOSED CONSTRUCTION	MPS'S PROPOSED CONSTRUCTION
(Claims 41 of '178 Patent) (Claims 1, 34 of '258 Patent)	greater variation than the regulated voltage (*i.e.*, controlled value).	voltage.

The MPS proposed construction clearly excludes operation *at* the regulated voltage and requires a voltage difference that is a characteristic of one embodiment (*i.e.*, the hysteretic comparator), but not all embodiments. MPS relies on ALJ Harris's erroneous claim construction from the '564 Investigation in support, which is now on petition for review by the ITC. Despite the absence of any disclaimer or express definition in either the specification or the prosecution, the ALJ construed "substantially at the regulated voltage" to exclude "at the regulated voltage." (Joint Appx., Tab Q at Q27). The ALJ's construction (1) contradicts well-established Federal Circuit law interpreting the term "substantially," (2) is contrary to the interpretation of the same claim term in the *Impala* litigation, (3) limits the asserted claims to a particular embodiment involving a hysteretic comparator (while explicitly ignoring another embodiment that does not use such a comparator), and (4) violates the doctrine of claim differentiation by impermissibly reading the hysteretic comparator limitation of Claim 5 into the other preceding claims.

In the sleep mode claims, the voltage is maintained "at the regulated voltage" during the first state of circuit operation and "substantially at the regulated voltage" during the second state of circuit operation. *See e.g.*, Joint Appx., Tab A at col. 7:6-26 and col. 13:18-20; Joint Appx., Tab B at claim 1 at col. 16:40-57. The plain and ordinary meaning of the term "substantially at the regulated voltage" encompasses voltages that are near or "at the regulated voltage."

Based on this logic, the district court in the *Impala* litigation specifically stated that "substantially at" allows for, but does not require, greater variation in the regulated voltage. (Joint Appx., Tab N at N25). Even the ALJ acknowledged that, "[t]he term substantially might

be understood to mean 'nearly' or 'for the most part.' … It might also in some circumstances indicate that a certain amount of leeway or difference is permitted when comparing two objects or events to determine whether or not they are the same." (Joint Appx., Tab Q at Q26-27). Nevertheless, the ALJ found that "[t]he word substantially is used to indicate that the voltage *should not be exactly the same*, and that the difference between the voltages is important for operation of the claimed invention." *Id.* at Q27 (emphasis added). The ALJ, in effect, construed "substantially at the regulated voltage" to mean "not at the regulated voltage." That erroneous claim construction is being reviewed by the ITC.

The ALJ's construction also is contrary to numerous Federal Circuit cases construing the term "substantially," which that court has frequently reviewed. *See Deering Precision Instruments, L.L.C. v. Vector Distribution Sys., Inc.*, 347 F.3d 1314, 1322 (Fed. Cir. 2003) ("This court is asked, once again, to construe the meaning of the term 'substantially" in a patent claim.") When construing "substantially" as a term of approximation modifying a condition, the Federal Circuit does not exclude the exact condition from the meaning of the construed term. *Playtex Prods., Inc. v. Procter & Gamble Co.*, 400 F.3d 901, 909 (Fed. Cir. 2005) ("[W]e … conclude that 'substantially flattened surfaces' means surfaces, including flat surfaces, materially flatter than [a cylinder]."); *EMI Group N. Am., Inc. v. Intel Corp.*, 157 F.3d 887, 895 (Fed. Cir. 1998) (construing the phrases "substantially aligned" and "substantially zero overlap" to mean "the same as or very close to perfect alignment" and "the same as or very close to zero overlap," respectively); *Amhil Enters. Ltd. v. Wawa, Inc.*, 81 F.3d 1554, 1562 (Fed. Cir. 1996) ("[The term] 'substantially vertical face' must be construed as the same as or very close to 'vertical face'"); *see Deering*, 347 F.3d at 1323. The ALJ clearly erred in reading "substantially at regulated voltage" to exclude "at the regulated voltage."

In the '564 Investigation, the Commission Investigative Staff also agreed with Linear's proposed construction, found that Linear's construction was "consistent with the teachings of the specification," and agreed that the claim does not require a greater degree of variability in the second state of operation as compared to the first state of operation, but merely permits such a greater degree of variation." (Joint Appx., Tab W at W35).

The ALJ erroneously concluded that the voltages *must* be different because without that difference, the third circuit would always override the second circuit and affect the intended operation of the circuitry. (Joint Appx., Tab Q at Q25 and Q27). That conclusion is flatly contradicted by a key passage in the patent that describes how sleep mode (*i.e.*, second state of circuit operation) may be triggered by several different methods.

> It will be apparent to those of ordinary skill in the art that although the present invention has been discussed above with reference to a hysteretic voltage comparator for generating the sleep mode control signal to cause the switching regulator to go into and awake from the sleep-mode, other means for performing the same function are also possible. For example, if desired, the sleep mode control signal could be generated in response to a monitored **output current**.

Joint Appx., Tab A at 16:5-11 (emphasis added).

This other embodiment clearly demonstrates that a voltage offset is far from necessary for the second and third circuits to operate harmoniously, because output current can be directly measured for purposes of determining when to enter or exit sleep mode. Requiring a voltage difference (*i.e.*, offset) to exist between the regulated voltages during the first and second states of circuit operation unnecessarily restricts the analysis to a particular embodiment containing a hysteretic comparator as part of the third circuit. Even the ALJ appeared to acknowledge that such a requirement would limit the asserted claims to a particular embodiment involving a hysteretic comparator, while ignoring another embodiment that does not use such a comparator. Joint Appx., Tab Q at Q25. Glossing over this point, the ALJ nonetheless concluded that "the

specification does not disclose or support an embodiment in which the voltages are the same, at least when they are measured as averages." *Id.* at Q27. Even putting aside the factual errors in this statement, the ALJ ignored that it is black letter law that the claims may cover other embodiments even if the specification discloses only one preferred embodiment. *See Transmatic, Inc. v. Gulton Indus.*, 53 F.3d 1270, 1277 (Fed. Cir. 1995) ("[A] patent claim is not necessarily limited to a preferred embodiment disclosed in a patent.").

There is simply no basis to adopt the ALJ's construction, which flies in the face of the doctrine of claim differentiation, by implicitly reading the hysteretic comparator limitation contained in claim 5 into claim 1. Specifically, claim 5 of the '258 Patent states:

> 5. The circuit of claim 4, wherein the first feedback signal is a voltage feedback signal and the third circuit includes a **voltage comparator having hysteresis.**

(Joint Appx., Tab B at 17:1-3) (Claim 5) (emphasis added).

The hysteretic comparator limitation appears in dependant claim 5. It violates the doctrine of claim differentiation to include that limitation in the construction of "substantially at the regulated voltage" of claim 1. *Phillips*, 415 F.3d 1314-15 ("[T]he presence of a dependent claim that adds a particular limitation gives rise to a presumption that the limitation in question is not present in the independent claim") (citing *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 910 (Fed. Cir. 2004)).

Moreover, in all embodiments, including embodiments in which a hysteretic comparator is used, the average value of the output voltage may be the *same* in the first and second states. For example, in the preferred embodiment of Figs. 2 and 7, the output voltage in the second state is limited by the upper and lower thresholds of the hysteretic comparator. (Joint Appx., Tab A at col. 7:6-17). The upper and lower thresholds are set above and below the nominal regulated voltage level V_{REG}. *Id.* at col. 6:55-58 and col. 7:10-15. The amount of variation in the output

voltage above and below V_{REG} depends on the comparator's hysteresis, and there is no limit specified for the hysteresis or the thresholds. *Id.* at col. 6:64-7:5 and col. 7:15-17. The comparator thresholds can be chosen to correspond to output voltages above and below V_{REG} by the same amounts, resulting in an average output voltage in the second state that is the same as the average output voltage in the first state. *See* Blauschild ¶ 27.

For all of these reasons, the proper construction for "substantially at the regulated voltage" is "allowing for, but not requiring, greater variation than the regulated voltage."

8. "First State Of Circuit Operation" And "Second State Of Circuit Operation"

The parties' constructions of a "first state of circuit operation" and a "second state of operation" are as follows[5]:

CLAIM TERMS	LINEAR'S PROPOSED CONSTRUCTION	MPS'S PROPOSED CONSTRUCTION
first state of circuit operation (Claims 1, 34, 41 of '178 Patent) (Claims 1, 34 of '258 Patent)	A state in which the switching transistors are both enabled for switching and are synchronously switched such that one transistor is ON and the other is OFF, with a varying duty cycle to maintain a regulated voltage at the output terminal.	A state in which the output voltage is maintained during high load current conditions by switching the switching transistors in a complementary manner to provide power to the load.
second state of circuit operation (Claims 1, 34, 41 of '178 Patent) (Claims 1, 34 of '258 Patent)	A state (excluding deadtime) during which both switching transistors are OFF and current is supplied to the load by the output capacitor.	A state in which, as a result of low load current conditions, the output capacitor maintains the output voltage substantially at the regulated voltage, while the switching transistors are disabled.

Linear's proposed construction of these two phases is consistent with the plain language of the claims, the written description, and the *Impala* construction. With regard to "first state of

[5] Because MPS makes the same argument to place unnecessary limitations on "first state of operation" and "second state of operation," Linear addresses these two claim terms together to rebut MPS's flawed argument in one place.

operation", claim 1 of the '258 Patent recites how "a first control signal is generated during a first state of circuit operation, the first control signal being responsive to the first feedback signal to vary the duty cycle of the switching transistors to maintain the output terminal at the regulated voltage". The common specification describes the claimed "first state of circuit operation" as follows:

> For example, at high output current levels during a first state of operation the switch continually alternates between an ON state and an OFF state to maintain the output voltage V_{OUT} at the regulated voltage level V_{REG}.

(Joint Appx., Tab A at col. 8:4-8). In the first state, the switching transistors are in a mode of operation in which they are continually and alternately switching ON and OFF. In accordance with specification's teachings, the district court properly held that:

> The 'first state of circuit operation' is the state in which the switching transistors are both enabled for switching and are synchronously switched such that one transistor is ON and the other transistor is OFF, with a varying duty cycle to maintain a regulated voltage at the output terminal.

(Joint Appx., Tab N at N8).

Similarly, Linear's proposed construction of the phrase "second state of circuit operation" is based upon the claims and the written description. The claims provide the contextual definition of the phrase. Claim 1 explains that the "second state of circuit operation" is the state in which both switching transistors are simultaneously OFF and the output voltage is able to be maintained substantially at the regulated voltage level by the output capacitor without continuously turning the switch ON and OFF (except for dead time). *See e.g.*, Joint Appx., Tab B at claim 1. Linear's construction is consistent with this intrinsic evidence as well as the *Impala* construction. *See* Joint Appx., Tab N at N26 ("During the second state of operation in which the switching transistors are simultaneously off, current is supplied to the load by the output capacitor"); *see also*, Joint Appx., Tab A at col. 7:8-11.

MPS relies on the ALJ's ID which incorrectly construed a "first state of circuit operation" and "second state of circuit operation" to be linked to high load currents and low load currents, respectively. (Joint Appx., Tab Q at Q29). Not only is this claim construction unnecessarily limiting in light of the claim language and the intrinsic evidence, but in fact is inconsistent with the specification's teachings. For these reasons, the Commission Investigative Staff agreed with Linear's proposed construction during the '564 Investigation. (Joint Appx., Tab V at V40-V43).

As previously discussed, the Patents-in-Suit teach two states of circuit operation: (1) a first state with synchronous switching; and (2) a second state with sleep mode or reverse current protection. Although the first state *generally* occurs during high and medium load current and the second state *generally* occurs during low load currents, the claim language does not require these conditions.

Indeed, not only is the ALJ's overly-restrictive interpretation inconsistent with the claim language, but the specification flat-out contradicts such a myopic reading. The specification clearly teaches that the circuit will periodically change back and forth between the second and first states even during extended periods of low load current. The periodic transition is necessary to recharge the output capacitor C_{OUT} as described below:

> If the load current remains low, C_{OUT} will **recharge** to a voltage level in excess of V_{REG} and the feedback voltage V_{FB} will again trip comparator 74 after only a few cycles. … When the output voltage falls below the regulated voltage level in such a mode, control circuit 70 is adapted to briefly turn switch 15 ON to **recharge** the output capacitor C_{OUT} back to a voltage level in excess of the regulated voltage.

Joint Appx., Tab A at col. 7:2-5 and 10-16 (in reference to Fig. 2, emphasis added).

> As discussed above, control circuit 170 periodically **wakes up during sleep mode** to turn P-MOSFET 16 ON to **recharge** the output capacitor C_{OUT}. It will be apparent to those of ordinary skill in the art that although N-MOSFET 15 is maintained OFF during such wake-up periods, this does not have to be the case. For example, while control circuit 170 is recharging output capacitor C_{OUT}, such

> **recharging could be accomplished by alternately turning the switching transistors OFF so as to vary the duty cycle and thereby recharge the output capacitor C_{OUT}.**

Id. at 8:61-9:3 (in reference to Fig. 4, emphasis added).

> If the load current remains low, output capacitor C_{OUT} will **recharge**, and the feedback voltage V_{FB} will again trip comparator 74 after only a few switch cycles. Thus, during light load conditions, the output voltage V_{OUT} will oscillate between upper and lower thresholds values, as discussed above.

Id. at 13:14-19 (in reference to Fig. 7, emphasis added).

These passages reveal that the recharging operation can occur by momentarily going back to the first state of circuit operations (*i.e.*, alternately turning the switching transistors on and off) *even though the load current demand continues to remain low for extended periods of time*.

MPS's construction contradicts the specification by requiring that the "first state" be linked to high load currents and the "second state" to low load currents. It also improperly reads in a limitation that excludes the disclosed embodiments where the switching takes place even though load demand remains low. Under well-established precedent, a construction that excludes an embodiment described in the specification is rarely correct. *See Vitronics*, 90 F.3d at 1581 ("Indeed, if 'solder reflow temperature' were defined to mean liquidus temperature, a preferred (and indeed only) embodiment in the specification would not fall within the scope of the patent claim. Such an interpretation is rarely, if ever, correct and would require highly persuasive evidentiary support …").

In short, the proper construction for the "first state of circuit operation" and the "second state of circuit operation" does not link these two states of circuit operation to any *particular* load current levels. The ALJ's linkage of the first state solely to a *high load current* is inconsistent with the specification which expressly discloses that the first state can occur during extended periods of *low load current*. MPS also improperly seeks to introduce into a "first state

of circuit operation" an unsupported limitation that switching transistors are switched in a "complementary manner." MPS's construction is in that respect unduly restrictive and excludes independently controlled transistors. There is no basis for imposing such a limitation.

9. "Third Circuit"

The term "third circuit" is recited in asserted claim 1 of the '178 Patent and in asserted claims 1 and 34 of the '258 Patent. The parties' proposed constructions are:

CLAIM TERMS	LINEAR'S PROPOSED CONSTRUCTION	MPS'S PROPOSED CONSTRUCTION
third circuit (Claim 1 of '178 Patent) (Claims 1, 34 of '258 Patent)	An assembly of electronic components forming a control circuit that is distinct from each of the first and second circuits in that not every electronic component of the circuits is the same.	A circuit that is separate and distinct from both the "first circuit" and "second circuit."

Linear's construction is consistent with that of the Federal Circuit. The Federal Circuit ruled that 35 U.S.C. §112, ¶ 6 does not apply to this phrase in the '178 Patent. 379 F. 3d at 1320. Linear's construction is also consistent with that of the *Impala* district court to the extent not overturned by the Federal Circuit. (Joint Appx., Tab N at N9). ("The third circuit is distinct from each of the first and second circuits…"). Nothing in that construction, which contemplates the existence of three identifiable circuits, forecloses some commonality of circuitry. Linear disagrees with MPS's construction to the extent MPS intends to rely on the phrase "separate and distinct" to mean that the third circuit cannot share any elements or have any overlap with the circuitry of the earlier claimed first or second circuits. MPS's construction should be rejected as its construction would exclude the preferred embodiment and has no foundation in the specification. Examples of the third circuit are illustrated in Figs. 2 and 7 of the '178 Patent. (Joint Appx., Tab A). *See also,. e.g., id. at* col. 6:34-7:5; col. 12:46-13:2; and col. 16:5-16.

10. "First Control Signal"

The term "first control signal" is recited in asserted claims 1 and 34 of the '178 Patent and in asserted claim 1 of the '258 Patent. The parties' proposed constructions are:

CLAIM TERMS	LINEAR'S PROPOSED CONSTRUCTION	MPS'S PROPOSED CONSTRUCTION
first control signal (Claims 1, 34 of '178 Patent) (Claims 1 of '258 Patent)	A control signal generated by the second circuit and used to affect the operation of other circuitry.	A signal generated by the second circuit and used to affect the operation of other circuitry, which signal is separate and distinct from the "second control signal".

Linear's proposed construction is consistent with that of the district court in the *Impala* litigation which construed "control signal" as "a signal generated by a circuit and used to affect the operation of other circuitry." (Joint Appx., Tab N at N8). The construction is supported by the specification. *See, e.g.*, Joint Appx., Tab A at the output of one-shot circuit 25, or a replacement circuit, col. 4:8-45; col. 9:13-22; output of 245 in Fig. 7; col. 4:8-52; col. 5:53-54; col. 6:17-33; col. 9:36 – col. 11:67; and col. 12:14-45.

Linear opposes MPS's construction to the extent MPS seeks to impose a requirement (the phrase "separate and distinct") that the first and second control signals must remain completely isolated and not interact with one another. There is no such requirement in the specification. Indeed, it would be a fallacy to conflate the issue of being distinct (*i.e.*, separately identifiable) with that of one signal not being able to affect the other. MPS attempts to add limitations unsupported by the intrinsic evidence.

11. "Second Control Signal"

The term "second control signal" is recited in asserted claims 1 and 34 of the '178 Patent and in asserted claim 1 of the '258 Patent. The parties' proposed constructions are:

CLAIM TERMS	LINEAR'S PROPOSED CONSTRUCTION	MPS'S PROPOSED CONSTRUCTION

CLAIM TERMS	LINEAR'S PROPOSED CONSTRUCTION	MPS'S PROPOSED CONSTRUCTION
second control signal (Claims 1, 34 of '178 Patent) (Claims 1 of '258 Patent)	A control signal generated by the third circuit and used to affect the operation of other circuitry.	A signal generated by the third circuit and used to affect the operation of other circuitry, which signal is separate and distinct from the "first control signal".

Here again, Linear's construction of "first control signal" is consistent with the *Impala* claim construction. The *Impala* district court construed a "control signal" to mean "a signal generated by a circuit and used to affect the operation of other circuitry." (Joint Appx., Tab N at N8). (The Federal Circuit left this construction undisturbed.) Examples of the second control signal are described throughout the specification. *See, e.g.*, Joint Appx., Tab A at col. 5:55-58; col. 5:59 - col. 6:5; col. 6:34 - col. 7:21; col. 12:49 - col. 13:19. Additionally, for reasons already stated above for the "first control signal", MPS's attempts to impose a requirement (the phrase "separate and distinct") that the first and second control signals must remain completely isolated and not interact with one another should be rejected.

12. "Threshold Fraction Of Maximum Rated Output Current"

The phrase "threshold fraction of maximum rated output current" is recited in asserted claims 1, 34, and 41 of the '178 Patent. The parties proposed constructions are:

CLAIM TERMS	LINEAR'S PROPOSED CONSTRUCTION	MPS'S PROPOSED CONSTRUCTION
threshold fraction of maximum rated output current (Claims 1, 34, 41 of '178 Patent)	Predetermined level or value at which some change in circuit operation takes place, wherein that level or value is a number greater than zero that represents the proportionality of two positive numbers, the proportion being relative to a rated maximum output current. (Predetermined means determined	A fixed number greater than zero that is selected as a proportionality of two numbers, the proportion being relative to maximum rated output current.

CLAIM TERMS	LINEAR'S PROPOSED CONSTRUCTION	MPS'S PROPOSED CONSTRUCTION
	by design, and includes levels or values that may be fixed or variable.)	

Again, Linear's proposed construction is consistent with the *Impala* court's claim construction, the Federal Circuit's claim construction, and with the understanding of one of ordinary skill in the art.

The *Impala* district court adopted the following construction for "threshold fraction":

> '[T]hreshold fraction of maximum rated output current' is a number greater than zero that represents the proportionality of two numbers, the proportion being relative to a rated maximum output current. [citation omitted]

(Joint Appx., Tab N at N12).

MPS seeks to introduce the word "fixed" into its construction so that it can later argue that the "threshold fraction" must be immutable, over all operating conditions – a limitation that no real world circuit could ever meet. There is no such requirement in the specification and, as discussed further below, one of ordinary skill in the art reading the patent would understand that the "threshold fraction" can vary with input voltage as disclosed in the patent itself, and, with operating conditions in general (*e.g.*, variations in temperature and component values).

The *Impala* district court commented that, "the Court has difficulty discerning how the threshold fraction can be anything other than a constant percentage." *Id.* There is no indication, however, that the court was using the word "constant" to mean that the threshold fraction must remain fixed and immutable over all operating conditions (including input voltage), as MPS proposes. In fact, the defendant's argument the *Impala* litigation was that the threshold fraction should be limited to an "appreciable fraction". *Id.* at N13. Yet the district court found that even this was an "impermissible restriction of the claim language" and that "[a]ll the fraction needs to be is a 'number greater than zero.'" *Id.* at N12-N13.

MPS proposed construction, which would require that the "threshold fraction" must remain "fixed," meaning invariant under all conditions, would exclude circuits that use a Pulse Width modulator (PWM), rather than a Constant Off Time (COT) circuit of '178 Patent Fig. 2. The specification, however, expressly and unambiguously identifies the use of a PWM circuit as a direct substitute for the COT circuit that appears in every Figure of the patent. *See* Joint Appx., Tab A at Fig. 2, (Constant Off Time One-Shot 25). In discussing the COT circuit of Fig. 2, the patent clearly states that:

> As discussed above, the embodiments of the control circuits of the present invention shown in FIGS. 2-4 include one-shot circuit 25. In accordance with another feature of the present invention, the one-shot circuit could be replaced with other types of circuits that control the duty cycle of the power switch. For example, one-shot circuit [COT] 25 could be replaced with a pulse-width modulated [PWM] signal in response to a control signal.

Id. at col. 9:12-22.

Second, although discussed in the context of construing the "second means" of claim 34, the Federal Circuit cited to the same passage quoted above in finding that the PWM circuit was corresponding structure to the COT circuit under § 112 ¶ 6. 379 F.3d at 1322. As an apparatus claim that lacks the means-plus-function limitations of claim 34, claim 1 is presumably even broader in scope. Therefore, a PWM scheme in the place of a COT scheme logically should also be within the ambit of that claim. Consequently, MPS's argument flies in the face of the spirit, if not the letter, of the Federal Circuit's opinion.

Third, MPS's theory that replacing the COT with a circuit such as a PWM, whose output can vary with input voltage (V_{IN}), would be outside the reach of the claim, directly contradicts the teachings of the patent. The patent teaches that another alternative to using a COT whose output does not vary with input voltage (V_{IN}), is to use a COT whose output does vary with input voltage (V_{IN}):

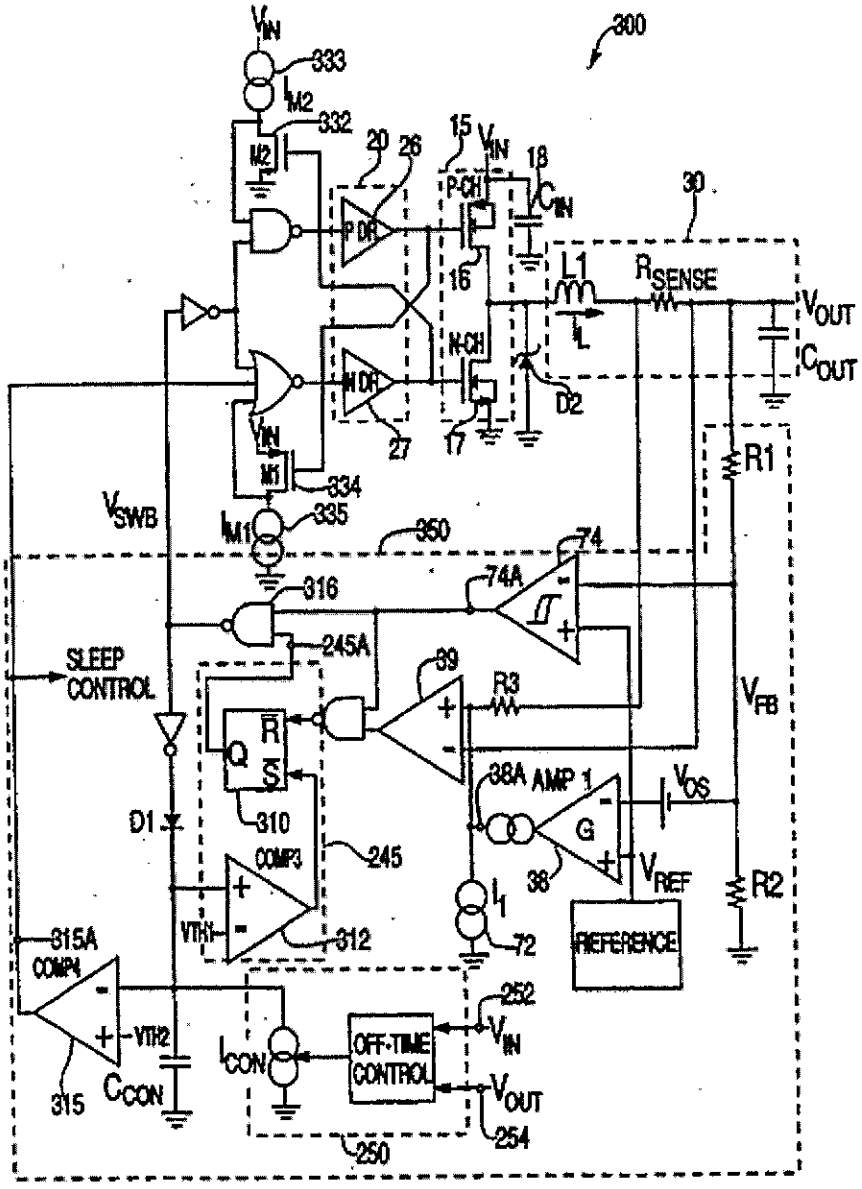
> In accordance with another feature of the present invention, one-shot circuit 25, which provides a constant OFF-time signal, could be replaced with a one-shot circuit that provides a variable OFF time control signal dependent upon the output voltage (V_{OUT}) and the input voltage (V_{IN}).

(Joint Appx., Tab A at col. 9:23-27). Moreover, claim 1 can also cover a COT circuit that varies with input voltage, since even a claim that is dependent on claim 1 covers such a circuit. Claim 14 of the '178 Patent, which depends on claims 1 and 7, reads as follows:

> The circuit of claim 7, wherein second level is generated [by the COT] for a time period dependent upon the input voltage.

Id. at col. 17:41-43. In short, the use of a COT or PWM that varies with input voltage (V_{IN}) should remain within the reach of the claims. The MPS proposed construction which would exclude that from the claim should be rejected.

The lack of support for MPS's position is further reinforced by Fig. 7, which illustrates the use of a COT implementation (OFF-TIME CONTROL 250) that varies with input voltage (V_{IN} 252). *See also* Blauschild at ¶ 24.



These disclosures show that either a COT or PWM can meet the limitations of the claims, whether their output varies with input voltage (V_{IN}) or not. Linear's construction makes this clear and is consistent with the spirit of the Federal Circuit's findings with respect to the patent's teachings of the interchangeability of a COT with a PWM circuit.

13. "Threshold"

The term "threshold" is recited in asserted claim 3 of the '258 Patent. The parties' proposed constructions are:

CLAIM TERMS	LINEAR'S PROPOSED CONSTRUCTION	MPS'S PROPOSED CONSTRUCTION
threshold (Claim 3 of '258 Patent)	Predetermined level or value at which some change in circuit operation takes place. (Predetermined means determined by design, and includes levels or values that may be fixed or variable.)	A fixed point, such as a current or voltage level, for a given effect, result, or response.

Claim 3 of the '258 Patent states:

> The circuit of claim 2 wherein the circuit changes from the second to the first state of operation in response to the magnitude of the first feedback signal falling below a first **threshold** level.

(Joint Appx., Tab B at col. 16:60-64) (emphasis added). In addition to the reasons stated above for "threshold fraction," the plain meaning of the word "threshold" is a level to which something is compared, or at which a change takes place. Linear disputes MPS's construction to the extent MPS contends that the threshold must remain fixed and immutable over all operating conditions. The specification does not support MPS's position that the threshold must be fixed. The term "threshold" is used in the specification to refer to variable levels or values. *See* Joint Appx., Tab A at Fig 7; col. 4:36-41; col. 6:17-47; and col. 12:14-29.

14. The Means-Plus-Function Limitations Of '178 Patent Claim 34

Claim 34 of the '178 Patent has limitations that parties agree are in "means-plus-function" language defined in 35 U.S.C. § 112(b). In claim 34, an element will cover those structures disclosed in the specification and their equivalents. It is therefore necessary to construe the elements "first means", "second means", and "third means" of claim 34. The

parties' constructions for the corresponding structures for carrying out that function are as follows:

CLAIM TERMS	LINEAR'S PROPOSED CONSTRUCTION	MPS'S PROPOSED CONSTRUCTION
a first means for generating a voltage feedback signal indicative of the voltage at the output (Claim 34 of '178 Patent)	This is a means-plus-function limitation, and it is to be construed to cover the corresponding structure(s) and equivalents thereof. The corresponding structures described in the specification include a resistor divider, with or without an operational amplifier, or other conventional voltage feedback circuits.	This is a means-plus-function element governed by § 112 ¶ 6. The structures disclosed in the specification that correspond to the recited function are the following and their equivalents: (i) the combination of resistors 36A and 36B; (ii) the combination of resistors R1 and R2 and operational amplifier 602; and (iii) voltage feedback circuit 220.
a second means for generating a first control signal … to maintain the output terminal at the regulated voltage (Claim 34 of '178 Patent)	This is a means-plus-function limitation, and it is to be construed to cover the corresponding structure(s) and equivalents thereof. The corresponding structures described in the specification include: • As illustrated in Fig. 2, the combination of drive circuit 20, transconductance amplifier 38, offset voltage V_{os} 76, reference voltage 37, current comparator 39, a feedback current path I_{FB} between inductor L_1 32 and current comparator 39, and constant off-time one-shot circuit 25, which outputs the first control signal; • combinations having a pulse-width-modulator circuit or a variable-off-time one-shot circuit (*e.g.*, circuit 240 of Fig. 5 or the circuit described at 10:15-16); or • As illustrated in Fig. 7, the combination of resistors R_{SENSE} and R_3, V_{REF}, V_{OS}, current comparator 39, amplifier 38,	This is a means plus function element governed by § 112 ¶ 6. The structures in the specification that correspond to the recited function are the following and their equivalents: (i) the combination of drive circuit 20, transconductance amplifier 38, offset voltage V_{OS} 76, reference circuit 37, current source I_1 72, current comparator 39, and constant off-time one shot circuit 25, which outputs the first control signal; (ii) combinations having a pulse-width modulator circuit that provides a pulse width modulated signal in response to a control signal, Patent col. 9:18-21; (iii) circuit 240 in Fig. 5.; (iv) the combination illustrated in Fig. 7 (resistors Rsense and R3, one-shot circuit 245, off time controller 250 and capacitor C_{CON}); (v) an "operational amplifier," Patent col. 10:15-16; and (vi) the circuitry described at col. 13 lines 36-46.

CLAIM TERMS	LINEAR'S PROPOSED CONSTRUCTION	MPS'S PROPOSED CONSTRUCTION
	one-shot circuit 245, off-time controller 250, and capacitor C_{CON}.	
a third means for generating a second control signal ... the period of time having a duration which is a function of the current supplied to the load by the regulator (Claim 34 of '178 Patent)	This is a means-plus-function limitation, and it is to be construed to cover the corresponding structure(s) and equivalents thereof. The corresponding structures described in the specification include: • As illustrated in Fig. 2, hysteretic comparator 74, V_{REF}, current source I_1 72, and logic circuits 66, 68, and 69; • As illustrated in Fig. 7, combinations such as the circuitry including 72, 74, 315, 316, V_{REF}, and related sleep control logic; or • combinations such as those disclosed at 16:5-12.	This is a means plus function element governed by § 112 ¶ 6. The structures in the specification that correspond to the recited functions are the following and their equivalents: (i) the combination of hysteretic comparator 74, the offset voltage 76, constant current source I_1 (72), logic gates 66, 68, and 69, and reference voltage 37, all as disclosed in Figure 2; and (ii) the circuitry disclosed in Figure 7 (72, 74, V_{OS}, 315, 316 and related sleep control logic).

Although MPS proposes the construction of the *Impala* district court, Linear's construction is preferred because while accurate for the most part, the *Impala* construction is somewhat ambiguous and contains some technical inaccuracies. For example, the *Impala* court first appears to link the various corresponding structures denoted by (i), (ii), and so forth for each of the "means" by the conjunction "and" instead of "or". The use of "and" makes it unclear if the *Impala* construction actually requires all of the elements described by (i), (ii), and so forth to be combined as *one* structure for each of the "means" recited in claim 34. This would be incorrect, because the elements described by (i), (ii), and so forth are the various equivalent structures disclosed in the specification for each of the "means" recited in the claim.

Second, the *Impala* construction includes current source I_1 72 of Fig. 2 as part of the "second means" of this claim, even though it should not and cannot be so included. That current

source has nothing to do with varying the duty cycle of the switching transistors during the first state of circuit operation. Instead, that current source (I_1 72 of Fig. 2) is only part of the "third means" that causes both switching transistors to be simultaneously OFF during the second state of circuit operation. As the specification states,

> "This over voltage condition [which triggers sleep mode] is intentionally induced at low average output currents by providing a constant current source I_1 72 coupled in parallel with amplifier 38. During the over voltage condition both MOSFETS 16 and 17 are maintained OFF by way of AND gate 66 and NAND gate 68."

(Joint Appx., Tab A at col. 6:50-55). Thus, Linear's construction more accurately describes the corresponding structures disclosed in the specification.

15. "Selected Sleep Mode Current Level"

The term "selected sleep mode current level" is recited in asserted claim 55 of the '178 Patent. Linear submits that the proper construction of this term is "a current level below which the regulator enters into a second mode of operation."

CLAIM TERMS	LINEAR'S PROPOSED CONSTRUCTION	MPS'S PROPOSED CONSTRUCTION
selected sleep mode current level (Claim 55 of '178 Patent)	A current level below which the regulator enters into a second mode of operation.	A fixed current level that represents a percentage of maximum rated output current below which the regulator is operated in a second mode of circuit operation.

Linear's construction is consistent with the plain language of the claims, the intrinsic evidence, and the construction of the *Impala* district court. The '178 Patent teaches embodiments in which a regulator enters sleep mode if inductor current or output current falls below some level, setting the design of the circuit. (Joint Appx., Tab A at col. 6:47-69, col. 12:46-59, and col. 16:5-12). Because Claim 55 of the '178 Patent recites "selected sleep mode current level" rather than a "threshold of maximum rated output" of the other claims, the plain

language of this claim indicates that this "selected sleep mode current level" is a level, and need not represent a percentage. The *Impala* district court rejected a similar attempt by the defendants to impose such a fraction limitation on the claim, ruling that "the plain language of this claim precludes the threshold fraction limitation." (Joint Appx., Tab N at N30). It further recognized that Linear "maintained the distinction between claim 55 and other independent sleep mode claims" during prosecution thus, "[t]he threshold fraction limitation accordingly does not apply." *Id.*

VI. CONCLUSION

For the foregoing reasons, Linear respectfully requests that the Court adopt Linear's proposed constructions as set forth herein.

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CERTIFICATE OF SERVICE

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